For this study the CI of the CTV-breast needed to be >0.8. Furthermore, we used the same method as Struikmans et al. to compare the derived CIs for all RTTs with those of the delineation of the 2 radiation oncologists [1].

Results: The mean CI for each single patient was higher than 0.8 for the RTTs and radiation oncologists together. In both separate groups the mean CI was higher than 0.8 as well, the values are indicated in table 1.

Conformity Index

	RT oncologists + RTTs	RTTs	RT oncologists
Patient 1	0.901	0.901	0.898
Patient 2	0.904	0.911	0.867
Patient 3	0.875	0.872	0.876
Patient 4	0.912	0.911	0.926
Patient 5	0.920	0.918	0.923
Average of the pts	0.902	0.903	0.898
Standard deviation	0.017	0.018	0.027

Table 1. Conformity Indices

The results show that the CI of the CTV-breast for the RTTs and radiation oncologists do not differ significantly. In addition we noted that the visual differences are mainly located on the lateral, medial and dorsal side of the breast. This is shown in the figure below.

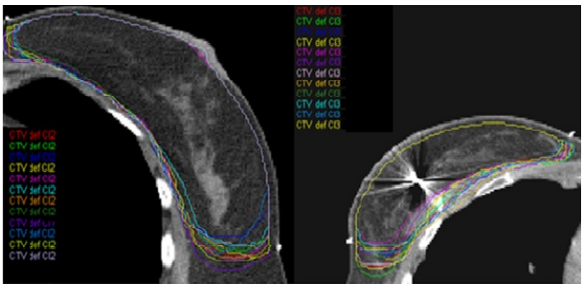

Figure 1. patient no.2 and no.3, delineations of RTTs and radiation oncologists

Conclusion : With a mean CI of about 0.9 for both groups, the CIs were >0.8 for the five delineated patients.

Recommendations: We recommend that RTTs will delineate the CTV-breast in our radiotherapy department. When the RTTs delineated the CTV-breast, this will be supervised by the radiation oncologists. Both the RTTs and the radiation oncologists need to work according to the delineation guidelines. The final approval must be done by the radiation oncologist.

Based on the average number of 100 patients treated with breast conserving radiotherapy per year we recommend that five RTTs need to be trained to delineate the CTV-breast in breast conserving radiotherapy. In our opinion it is enough when the five RTTs delineate at least twenty patients a year.

[1] H Struikmans et al., Radiother Oncol. 2005

EP-1623

Contouring of critical organs in pelvis area in postoperative radiotherapy - problems and solutions

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Purpose/Objective: Contouring organs at risk is generally performed by the RTTs. These organs in the lower pelvis have large variations, especially in patients undergone surgical treatment. The objective of the study is to analyze the contouring process of organs at risk in lower pelvis in patients undergoing postoperative radiotherapy, to present the most frequently observed problems and to point out the solutions to overcome them.

Materials and Methods: Postoperative treatment was applied to 157 patients in 'Tokuda Hospital Sofia' in the period XI.2009 – XI.2014. From the total number 28 patients were operated due to prostate carcinoma and 129 patients due to carcinoma uteri. Patients were scanned on a CT LifgtSpeed^{TM}RT^{16} with the protocol for Pelvis scanning without intravenous contrast. The patients were prepared for CT scanning and irradiation with empty bladder. The protocol Helical full, 1,0 sec rotation speed, pitch 0.938:, thickness/interval 0.5 mm; Large FOV; Auto mA. A planning system ERGO++ was used to contour organs at risk. Obtained data were CT processed using Microsoft ExcelTM.

Results: It was found in 10% of male patients have expressed atony of the bladder and 30% showed severe incontinence. Within the female patients 30% showed atonia and only 10% have incontinence, but at considerably lower level. Within prostate cancer patients there were no cases showing lymphocele. Among the patients operated from carcinoma uteri 20% were found with significant degree of lymphocele, as in 5% of them additional surgical treatment was applied. In one patient bilateral aneurism of the common iliac arteries was found.

Conclusions: The knowledge of the normal anatomy of lower pelvis and the capabilities for contouring organs at risk has been incorporated into the modern planning algorithms and allows reduction the dose in the organs at risk. There are often considerable aberrations in the anatomic localization, shape and size of the organs at risk in the patients undergone surgery. This requires high level of knowledge of those variations, individual approach and very often directing the patient for additional surgical treatment. Such requirements raise creativity in the skills of RTTs at a new higher level. Thus, the team working capabilities of RTTs together with the physicians are improved and patients are provided with best choice of treatment.

EP-1624

A one-stop palliative treatment with a CBCT as planning-CT

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Purpose/Objective: Institute Verbeeten is located in 3 cities, Tilburg, Breda, and 's-Hertogenbosch. Only in Tilburg we have access to a planning-CT scan. As patients have to travel for the CT scan a method has been developed to use the CBCT as

imaging device for treatment planning. This method will be used for palliative patients with painful vertebral metastases. Our challenge is to determine the impaired vertebrae on the CBCT. These vertebrae are known in advance from the diagnostic scan. The CBCT only covers 16 cm, which makes it impossible to count the vertebrae for cases in which either L5 or C1 is not shown.

Materials and Methods: A Varian iX accelerator with OBI is used to make the CBCT. Treatment planning is performed with Eclipse™ v10.0 (Varian). We use a homemade bottom plate on the table which contains lead BB's every 10cm. These marker positions are distinguishable by the number of BB's. We take a kV-image including either C1 or L5 and note at which vertebra the first marker position is projected. Then, we shift the table, take another image with both the first and a second marker position, and note at which vertebra this second marker position is projected. We repeat this procedure until the impaired vertebrae and the marker closest to these vertebrae is imaged. We perform the CBCT with the center at these impaired vertebrae. The CBCT is used for treatment planning. QA of the calculation shows that the dose calculation on the CBCT scan corresponds with the calculation on the CT scan with deviations up to 1.5% for a 6MV beam, calculated with the AAA algorithm. The patient is treated the same day without a regular planning-CT.

Results: We have tested the imaging procedure on an anthropomorphous phantom. Figure 1 shows the kV-images when counting starts at L5. The red arrow and the blue arrow each denote the same patient position on the couch. In between the images the couch has been shifted approximately 10 cm.

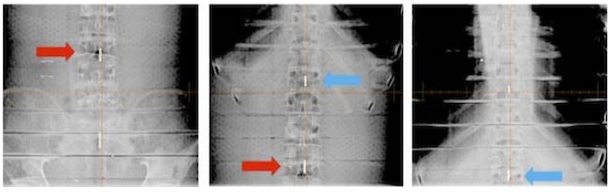

Fig 1

Conclusions: We intend to perform the treatment of vertebral metastases for palliative patients close to their home in a one-stop procedure. We use an imaging procedure based on kV-imaging with the aid of a homemade bottom plate, followed by a CBCT. The CBCT is used for treatment planning. The procedure has been tested on an anthropomorphous phantom and will be used clinically from January 2015.

EP-1625

Validation of an ultrasound bladder scanner in the workflow of treatment planning

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Purpose/Objective: Our goal was to optimize the bladder volume on the planning CT scan according to the department bladder filling protocol, for patients referred for pelvic radiotherapy.

Our hypothesis was, the ultrasound bladder scanner could define the bladder volume, with the accuracy 100ml, compared to the planning CT scan. We also wanted to evaluate the bladder volume changes according to time.

Materials and Methods: All patients were instructed to comply with a bladder filling protocol before planning CT scan. Optimal filling was considered to be 150-300 ml.

A radiographer measured the bladder volumes three times, according to the list below.

1. ultrasound bladder scan before patient set up, average of 3 measurements
2. measurement on planning CT scan, using bladder outline contours
3. ultrasound bladder scan after planning CT scan, average of 3 measurements

All scans were time registered. If the bladder volume in scan 1 was >300 ml we asked the patients to empty the excess bladder volume corresponding to measurements in cups. Afterwards we restarted the measuring. These reported volumes are all after emptying. If the bladder volume in scan 1 was 150-300 ml or < 150 ml, we did not interfere.

Results: We collected data from 33 patients, with the following cancer diagnoses: Anal, prostate, Rectal and gynecological. All patients had scan 1 and scan 2 and 30 patients also had scan 3. All patients who were asked to empty excess bladder volume could cooperate to the instructions.

The median time span between scan 1 and scan 2 was 12 min (range 6-45 minutes) and the median time span between scan 1 and scan 3 was 17 min (range 10-45 min). The median bladder volume in scan1 was 103 ml (range 24-264 ml), in scan 2: 179 ml (range 61-400 ml) and in scan 3: 181ml (range 16-312 ml)